



Australian Resuscitation Advisory Network

BLS Guideline 1 – **AIRWAY MANAGEMENT**

Scope

Who does this guideline apply to?

This guideline applies to all persons who need airway management. Airway management is required to provide an open airway when a person is unconscious, has an obstructed airway, or needs ventilation.

Who is the audience for this guideline?

This guideline is for use by BLS first responders, including bystanders, first aiders, and health professionals away from a clinical setting.

Age Classifications for Resuscitation

For the purposes of resuscitation:

- **Adult** is defined as a person > 8 years of age i.e. 9 or above or a person who physically appears to be that age e.g. an 8 year old child that weighs 70kg would be classified an adult because of physical appearance.
- **Child** is defined as a person between the ages > 12 months and ≤ 8 years old or a person who physically appears to be that age.
- **Infant** is defined as a person between the ages of 0 and ≤ 12 months or a person who physically appears to be that age e.g. a premature infant of 15 months of age, may be a similar size and weight to an 11 months old infant and therefore this person would be classified an infant.

Recommendations

The Australian Resuscitation Advisory Network (ARAN) makes the following recommendations:

1. In an unconscious person that requires ventilation, establishment and maintenance of a patent airway may take precedence over injury, including the possibility of spinal injury.
2. To assess the airway, manually open the mouth by manipulating the lower jaw. This can be attempted with the person on their back or in the position in which they have been found. If solids are found these can be removed by using the finger/s.

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3. In instances of Sudden Cardiac Arrest (SCA), the establishment of an airway and associated ventilation are not a priority over fast, deep compressions. In some instances ventilations can actually decrease survival rates of persons in cardiac arrest.
4. The removal of fluids from a person's airway in resuscitation attempts is only necessary if there is vomit present and where ventilation is indicated. In most cases the removal of saliva, blood (unless in large volumes) and water is not necessary for effective resuscitation and delays other lifesaving interventions.
5. If the airway becomes compromised before or during resuscitation with vomit promptly roll the person onto their side to clear the airway.
6. For an unresponsive adult or child, open the airway using the "head tilt" method. For persons with neck injury, large neck, stiff neck or pronounced kyphosis (hump on back) or where the "head tilt" method fails, use "jaw-thrust" method instead. For an infant (< 12months or appears to be), open the airway by placing the head in the neutral position and support the jaw from falling back.
7. The presence of a foreign body, impacted in the upper airway (indicated by inability to ventilate despite good airway management), the "ARAN Choking Guideline should be used.

General Principles

When someone is unconscious (unresponsive to pain), all muscles are relaxed. If they are left lying on their back, the tongue, which is attached to the back of the jaw, can fall against the back wall of the throat and blocks air from entering the lungs.

The unconscious person is further at risk because of the inability to cough out foreign material in the airway. This may cause airway obstruction, or laryngeal irritation and foreign material may enter the lungs. The most important fluid to prevent entering the lungs is vomit.

In some persons (especially young children) if foreign material irritates the vocal cords, a protective reflex muscular spasm (laryngeal spasm) prevents the entry of material (including fluids) into the lungs. This may result in partial or complete airway blockage of the entrance to the trachea (windpipe) with the person often making an abnormal noise (stridor) during attempts to breathe. Airway closure due to laryngeal spasm can be complete; in this case there is no noise because there is no airflow. When consciousness is lost, the spasm usually relaxes.

Positional Airway Obstruction

Cardiac arrest is not of course the only reason for unconsciousness. In cases of trauma and medical conditions or drug overdoses, the position in which the person is laying (or seated with their head slumped down in the case of a motor vehicle accident), can restrict normal breathing. In these cases where the person shows the effort to breath normally (indicted by rhythmical abdominal distension and/or chest muscle contraction) but the breathing is noisy or cannot be heard, the person will benefit from some early airway management (e.g. head tilt/chin lift/jaw thrust).

Positional Asphyxiation

In rare cases where a person is in a face down position (e.g. restrained with hands behind their back), the combination of the weight on the chest and restriction of chest expansion can lead to asphyxia, unconsciousness and death, even in the otherwise healthy person.

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Regurgitation is the passive flow of stomach contents into the mouth and nose. Although this can occur in any person, regurgitation and inhalation of stomach contents into the lungs (aspiration) is a major threat to an unconscious person. Regurgitation and aspiration is most frequently seen in large (obese) persons during resuscitation attempts. Regurgitation can also be minimised during resuscitation by appropriate airway management and ensuring that the person is not “over-ventilated”.

In resuscitation, regurgitation and vomiting are managed in the same way i.e. by promptly rolling the person on their side and manual clearance of the airway via gravity, fingers or suction device (prior to continuing ventilation).

If the person begins to breathe normally, they can be left on their side with appropriate head tilt. If not breathing normally, the person must be rolled on their back and resuscitation commenced.

Method

Airway Management

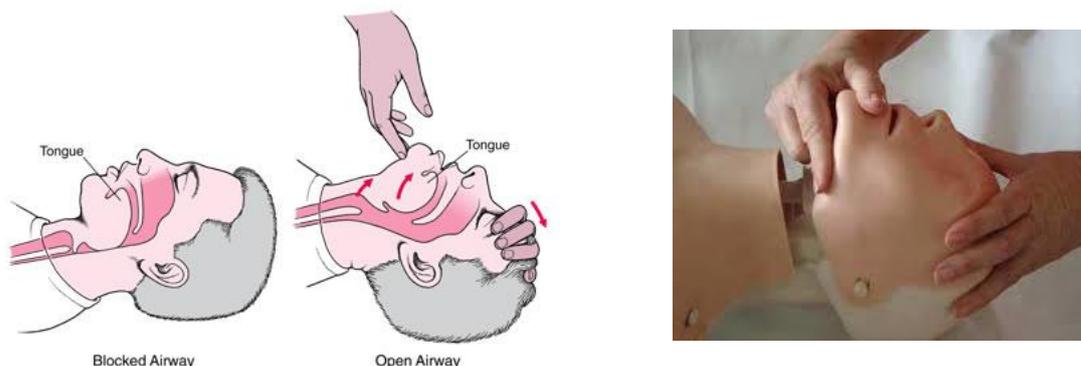
Airway management is required to provide an open airway when the person:

1. Is unconscious (i.e. no response to pain)
2. Has an obstructed airway
3. Needs ventilations (the need for ventilation in BLS first response is a person likely to have suffered a “Hypoxic Arrest” (resulting from a low availability of oxygen). This includes most children and adults who suffer cardiac arrest resulting from drowning, choking, strangulation, asphyxiation e.g. asthma.

For unresponsive adults and children (no response to pain), it is reasonable to open the airway using the “head-tilt” manoeuvre or “jaw thrust” method for persons with neck injury, large neck, stiff neck or pronounced kyphosis (hump on back) or where the “head tilt” method fails, . For BLS rescuers performing compression-only CPR, there is no need to use of any specific passive airway manoeuvre; however a pad underneath the upper shoulders may assist maintaining an open airway.

Head Tilt Manoeuvre

One hand is placed on the forehead or the top of the head. The other hand is used to provide “chin lift” e.g. “pistol grip”. The head (NOT the neck) is tilted backwards (see Figure 1). It is important to avoid excessive force. When the person is on their side, the head will usually remain in this position when the rescuer’s hands are withdrawn.



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Figure 1: Head tilt/manoeuvre (including “Pistol Grip”)

An effective, alternative “head tilt” manoeuvre, particularly when the person head is heavy and large is illustrated below (Figure 2). The hand is placed on the forehead of the person and pressure applied directly toward the ground. This pressure is not designed to rotate the head but to anchor the hand. Then the fingers are gently and slowly pushed onto the top of the person’s head, resulting in smooth, easy movement on any surface.



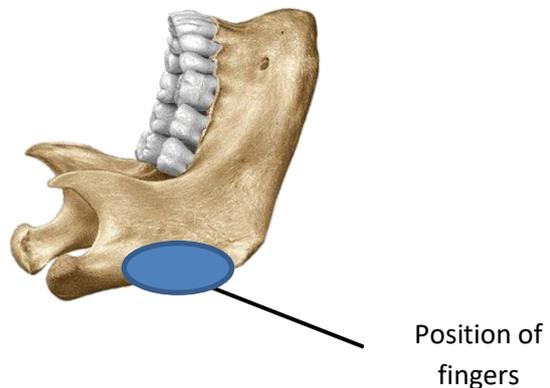
Figure 2: Alternative Head Tilt Method

Jaw Thrust Method

From behind the persons head place the index and middle finger of each hand on the flat section of jaw between the angle of the jaw and the earlobe (Figure 3.). The thumbs are places on the persons cheek bones for leverage and then the jaw is lifted up in the direction of the arrow as indicated.



Figure 3: Jaw Thrust Method



Children and Infants

An **infant**, in resuscitation terms, is defined as a person younger than one year (or one that appears to be). A **child** is then defined as a person one to eight years of age (or that appears to be this age). In both cases the principle to maintain an open airway and ventilations is more of a priority in cardiac arrest than for most adult arrests.

Children (1-8 years or appears to be)

Children should be managed similarly to adults, however head-tilt can be easily achieved by the pressure of 2 fingers lifting the chin and rotating the head.

Infants

In an infant, the upper airway is easily obstructed because of the narrow nasal passages, the entrance to the windpipe (vocal cords) and the trachea (windpipe). The trachea is soft and pliable and may be distorted by excessive backward head tilt or jaw thrust. Therefore, in an infant the head should be kept neutral head position and maximum head tilt should not be used (Figure 4). If these manoeuvres do not provide a clear airway, the head may be tilted backwards very slightly with a gentle movement.

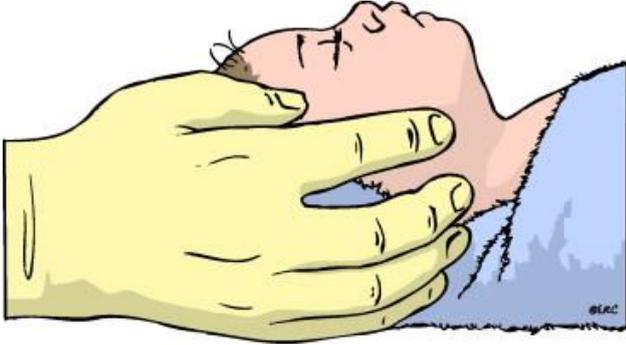


Figure 4: Infant in neutral head position

Recognition of Upper Airway Obstruction

Airway obstruction may be partial or complete, and present in the conscious or the unconscious person. Typical causes of airway obstruction may include, but are not limited to:

- Relaxation of the airway muscles due to unconsciousness with the person seated or laying on their back (this can usually be managed with correct posturing and/or airway methods described previously).
- Inhaled foreign body (especially in small children).
- Trauma to the airway
- Swelling of the airways due to burns, infection or allergic reaction.

The symptoms and signs of obstruction will depend on the cause and severity of the condition. Airway obstruction may occur gradually or suddenly, and may lead to complete obstruction within a few seconds.

In the conscious person who has inhaled a foreign body, there may be extreme anxiety, agitation, gasping sounds, coughing or loss of voice. This may progress to the universal choking sign, namely clutching the neck with the thumb and fingers (as shown in Figure 5).





Figure 5: Universal choking sign

Airway obstruction will cause the diaphragm muscle to work harder to achieve adequate ventilations. The abdomen will continue to move out but there will be loss of the natural rise of the chest (paradoxical movement), and in-drawing of the spaces between the ribs and above the collar bones during inspiration.

Partial obstruction can be recognised where:

- Breathing is laboured
- Breathing may be noisy
- Some escape of air can be felt from the mouth
- The choking person has an effective cough

Complete obstruction can be recognised where:

- There may be efforts at breathing
- There is no sound of breathing
- There is no escape of air from nose and/or mouth
- The person does not have an effective cough

Important Note: If a person appears to have a partial obstruction however their level of consciousness is deteriorating and/or they are turning blue, their obstruction should be treated as for a “Complete Obstruction”

Airway obstruction may not be apparent in the non-breathing unconscious person until rescue breathing is attempted.

Foreign Body Airway Obstruction (Choking)

A Foreign Body Airway Obstruction (FBAO) is a life-threatening emergency. Back blows and/or Abdominal thrusts (after the failure of back-blows) are effective for relieving FBAO in conscious adults and children >1 year of age. Although there are some reports of injury from the application of abdominal thrusts, these have been exclusively in infants (<1 year of age) or where the person attempting the technique has not been trained in its safe use. As all techniques in resuscitation have risks, and since the other option in these examples of complete airway obstruction was probably death, the small chance of injury is acceptable. There have been no respiratory studies, clinical studies or reports of success to support “chest thrusts” in the relief of FBAO in the conscious person using the method described the ARC i.e. with a victim sitting or standing, applying compressions to the chest with one hand.

“Back Blows” and “Abdominal Thrusts” should be applied in rapid sequence until the obstruction is relieved. More than one technique may be needed. Back blows should be attempted first as the pressure wave created in the airway is effective at relieving the most common obstruction i.e. high in the airway with smooth rounded objects that are easily dislodged.

Assess Severity

The simplest way to assess severity of a FBAO is to assess for an effective cough and ability to maintain colour and consciousness.

Effective Cough (Mild Airway Obstruction)

The person with an effective cough should be given reassurance and encouragement to keep coughing to expel the foreign material. If a person appears to have a partial obstruction however their level of consciousness is deteriorating and/or they are turning blue, their obstruction should be treated as for a “Severe (Complete) Airway Obstruction”

Ineffective Cough (Severe Airway Obstruction)

Conscious person

Perform up to five sharp back blows with the heel of one hand in the middle of the back between the shoulder blades. This should always be attempted in the “head down” position e.g. an infant may be placed across the rescuer’s lap and an adult can be bent over a chair or if seated bent over before applying the back blows.

Check to see if each back blow has relieved the airway obstruction. The aim is to relieve the obstruction with each blow rather than to give all five blows.

If back blows are unsuccessful the rescuer should perform up to abdominal thrusts.

Important Note: Do not attempt abdominal thrust on persons under 1 year old. In this case, chest thrust may be beneficial.

Abdominal Thrusts (Heimlich Manoeuvre)

With the choking person preferably standing, the rescuer positions themselves behind the choking person and reaches around the choking person. The rescuer makes a fist with one hand and positions this against the choking person abdomen in the location shown below (clear of any bony structures). The other hand then grasps the fist and pulls sharply inward and upward sharply. This is designed to make the diaphragm spasm and thus forcing the chest pressure to increase and build behind the obstruction.

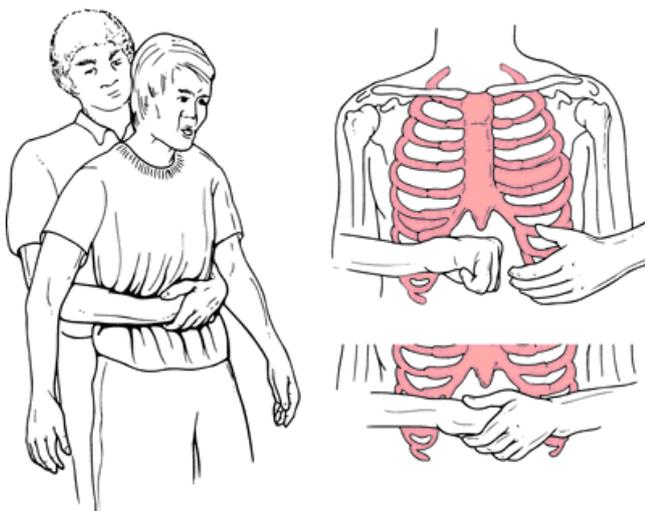


Figure 6: Abdominal Thrusts (Heimlich Manoeuvre)

Chest Thrusts (for persons under the age of 1 year)

Lay the person on their back. Identify the same compression point as for CPR and give up to five chest thrusts. These are similar to chest compressions but sharper and. With each chest thrust, check to see whether the airway obstruction has been relieved. The aim is to relieve the obstruction rather than deliver all five chest thrusts. If the obstruction is still not relieved and the person remains responsive, continue alternating five back blows with five chest thrusts.

Alternative Chest Thrust Method for Conscious Pregnant or Obese Person with FBAO

The original description of chest thrusts is a very useful technique for persons where pregnancy or obesity means that the rescuer cannot safely reach around the person with the FBAO and therefore abdominal thrusts are not possible. In this alternative method the rescuer stands behind the conscious person and reaches around the upper chest of the person, passing underneath the armpits. A fist is made with one hand (thumb tucked in against the centre of the person's chest). The fist is grasped with the other hand and these are pulled sharply and forcefully toward the rescuer.



Figure 6: Chest Thrusts

Unconscious person

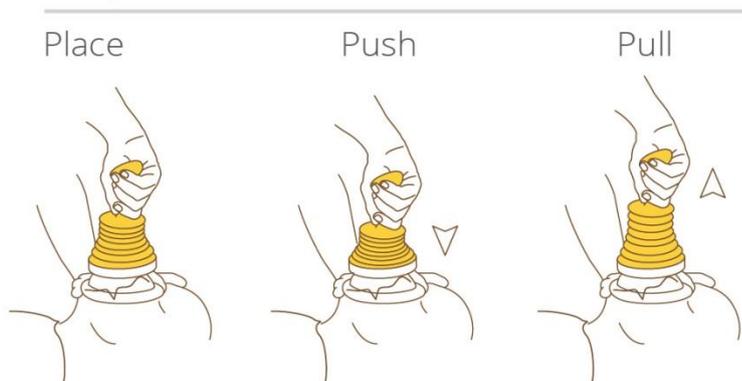
If the person becomes unresponsive a finger sweep can be used if solid material is visible in the airway. Apply abdominal thrusts in the supine position. Remove foreign body when it appears. If object is not relieved after 5 abdominal thrusts, commence CPR compressions.



Use of Self-Powered Anti-Choking Device

In cases of choking, where first aid measures have initially failed to dislodge the foreign body; ARAN recommends the use of a vacuum type anti-choking device (e.g. LifeVac). This device is designed to generate almost four times the pressure generated by abdominal thrusts and has successfully relieved obstructions in patients. The rationale for using this type of device is that if the airway pressure generated by back blows, chest thrusts, abdominal thrusts and/or CPR have fails to remove the obstruction, the vacuum powered device is able to provide additional pressure (by way of vacuum) and will not force obstruction further into the airway (as would be the case if ventilations were commneced in a patient who arrested due to an airway obstructiion).

Easy as



Management of Choking Emergency

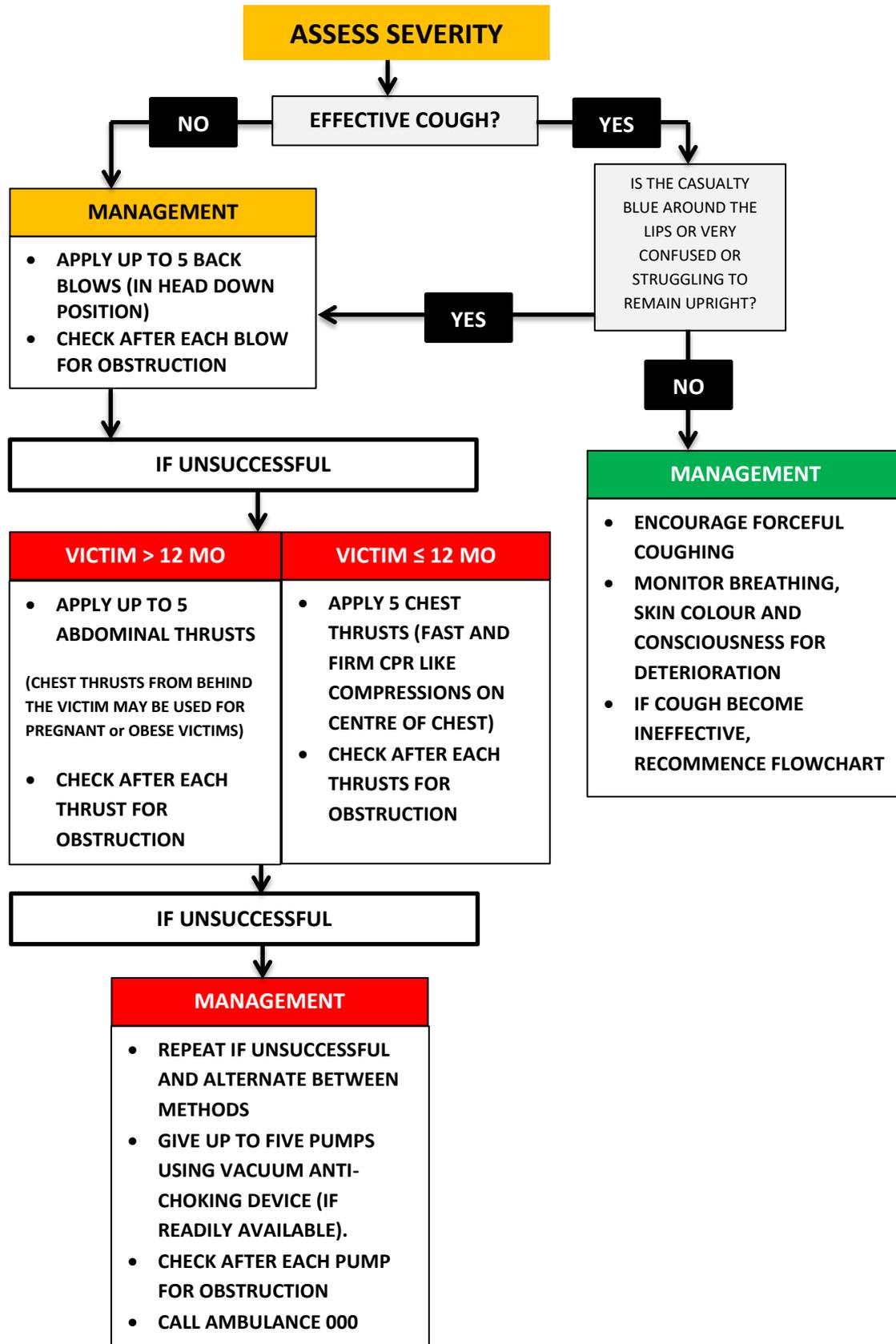


Figure 6: Management of Foreign Body Airway Obstruction (Choking) Flowchart

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